Comment on Milliman Research Report (Review of Proposed Amendment of Pennsylvania Rules of Civil Procedure Nos. 1006, 2130, 2156, and 2179)

Jonathan Klick, J.D., Ph.D.
University of Pennsylvania, Professor of Law
Erasmus University Rotterdam, Erasmus Chair of Empirical Legal Studies
Villanova University, Dean's Distinguished Fellow

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Executive Summary

The Milliman Report purports to find that the change of the venue rule governing medical malpractice cases in Pennsylvania, pursuant to the Medical Care Availability and Reduction of Error Act (MCARE), in 2003, caused a large drop in medical malpractice filings and awards, as well as a large reduction in the medical malpractice liability insurance premiums paid by Pennsylvania doctors. Based on these findings, the Milliman Report concludes that if Pennsylvania were to reverse the 2003 venue rule (which requires that a plaintiff files his claim in the county in which the underlying medical services giving rise to the claim were provided), litigation rates, judgments awarded, and malpractice insurance premiums would all rise, especially in Philadelphia County. However, despite the Milliman Report's claims, there is no credible empirical basis to predict that a reversal of the 2003 venue rule would change litigation rates, settlement or judgment amounts, or medical malpractice insurance premiums in Pennsylvania.

First, it is not possible to sort out the specific effect of the venue rule change separately from the other changes that occurred under MCARE. If many relevant policies, regulations, and practices are changing at the same time, it is not possible statistically to isolate the effects caused by any particular part of the package of changes.

Second, the Milliman report provides no way for a reader to assess whether its findings are statistically significant, as opposed to merely reflecting natural random variation.

Third, it is fatal to the Milliman conclusions to note that litigation rates, judgments and settlements, and insurance premiums were dropping in this time period nationwide, including in states that were not changing any of their medical malpractice laws. If the declines observed in Pennsylvania were also observed in states that did not move to more restrictive venue rules, it is not credible to conclude that Pennsylvania's declines were due to the venue rule change.

Once these issues are accounted for using national data, it is clear that Pennsylvania did not exhibit statistically significant declines in litigation rates, settlement/judgment amounts, or insurance premiums relative to other states, including the states that border Pennsylvania. Pennsylvania's changes in the post 2003 period are statistically indistinguishable from other comparable states that did not change their medical malpractice laws, including venue rules.

The data do not support the conclusion that medical malpractice claims, settlements, judgments, and insurance premiums would increase if the MCARE Act's venue restriction were reversed. The analysis and the conclusions in the Milliman Report are not reliable and do not meet even the most basic standards of empirical policy analysis.

Introduction

Pennsylvania enacted the Medical Care Availability and Reduction of Error Act (MCARE) in 2003. The MCARE Act substantially changed the medical malpractice system in Pennsylvania; it also changed a number of other aspects of the medical system in general as well as the way medical malpractice insurance is regulated in the state. Among the changes to the litigation system made by the MCARE Act was a restriction on where individuals could litigate their medical malpractice claims. After 2003, plaintiffs were constrained to file their claims in the county where the underlying medical service was performed. The Milliman Research Report (Review of Proposed Amendment of Pennsylvania Rules of Civil Procedure Nos. 1006, 2130, 2156, and 2179), hereafter the "Milliman Report" argues that this venue restriction led to reductions in medical malpractice litigation rates and awards, as well as decreases in medical malpractice liability insurance premiums, especially in Philadelphia County. Despite the Milliman Report's conclusions, there is no credible empirical basis to predict that a reversal of the 2003 venue rule would change litigation rates or awards in Pennsylvania.

The Milliman Report argues on the basis of these findings that if the restrictive venue rule is changed back to one that follows more general principles of civil procedure (e.g., allowing plaintiffs to file in any court that has personal jurisdiction over the defendant), medical malpractice litigation filing rates and awards will increase substantially, especially in Philadelphia County, and doctors in Pennsylvania will end up paying more for their medical malpractice liability insurance. The mechanism for these outcomes, according to the Milliman Report, is that the less restrictive venue rule will allow for more frivolous[1] medical malpractice claims to be litigated, as plaintiffs shop around for the most favorable jurisdiction.[2] According to this idea, more favorable jurisdictions will generate more plaintiff wins as well as higher judgments. Further, the Milliman Report suggests that, given the changing landscape of healthcare in which more doctors are part of large health systems that extend across the state, standard personal jurisdiction rules will give plaintiffs a largely unrestricted choice of where to bring any claim.

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[1] This claim is questionable given that in 2003 in conjunction with the MCARE Act, Pennsylvania Rule of Civil Procedure 1042 requires that a plaintiff file a certificate of merit in "any action based upon an allegation that a licensed professional deviated from an acceptable professional standard." Pa.R.C.P. 1042.3(a). This certificate of merit must verify at least one of the following: 1) an appropriate licensed professional has supplied a written statement that there exists a reasonable probability that the care, skill or knowledge exercised or exhibited in the treatment, practice or work that is the subject of the complaint, fell outside acceptable professional standards and that such conduct was a cause in bringing about the harm; 2) the claim that the defendant deviated from an acceptable professional standard is based solely on allegations that other licensed professionals for whom this defendant is responsible deviated from an acceptable professional standard; or 3) expert testimony of an appropriate licensed professional is unnecessary for prosecution of the claim.

[2] The Milliman Report also fails to note that the Pennsylvania Rules for Civil Procedure do provide a mechanism to guard against unfettered and unfair forum shopping. Rule 1006(d) allows for a change of venue for the convenience of a party or witnesses to any other county where the claim could have been brought (subsection 1) and it also allows for a change of venue if the court finds that a fair and impartial trial is not possible in the county where the claim was filed (subsection 2).

As detailed below, the Milliman Report makes unsupported inferences about the effect of the change in the venue rule. Because the venue rule changed at the same time as many other aspects of the medical malpractice system, not to mention contemporaneous changes in the liability insurance system and the medical delivery system in general, it is not possible to parse out the specific effects of the venue change separately from the effects of all of the other changes that came with the MCARE Act. There are empirical and theoretical reasons to believe that those other changes also affected the outcomes studied in the Milliman Report.

Beyond this general statistical concern, even if one examines just the effects of the MCARE Act in total, it is necessary to account for general nationwide trends in medical malpractice litigation and medical malpractice insurance. The Milliman Report analysis does not adequately account for these general trends.

There is no empirical basis to predict that a reversal of the 2003 venue rule would change litigation rates or awards in Pennsylvania. It is also the case that medical malpractice premiums are unlikely to be affected in a material way if the venue rule is changed.

The Problem of Causal Inference in the Milliman Study

The Milliman Report purports to provide evidence suggesting that the change of the venue rule in 2003 significantly reduced medical malpractice insurance premiums, the number of medical malpractice cases filed, and the size of the plaintiff judgments awarded. From this evidence, the Milliman Report concludes that a return to the less restrictive venue rule that prevailed in Pennsylvania prior to 2003 will result in increases in each of these outcomes, and these increases will be large.

There are a number of problems with this analysis. Perhaps most striking is the failure to take seriously the fact that the venue rule was not the only thing to change in Pennsylvania in 2003 that was relevant for medical malpractice litigation. Indeed, the venue change occurred as part of the Medical Care Availability and Reduction of Error Act (MCARE) which completely changed the medical malpractice environment in the state both from a litigation standpoint and from an underlying medical care perspective.

From a litigation standpoint, the MCARE Act: 1) precisely defined a physician's duty with respect to informed consent (section 504); 2) outlined the scope of punitive damages in Pennsylvania medical malpractice cases and created an effective tax on punitive damage awards of 25 percent (section 505); 3) provided for an affidavit of non-involvement for healthcare providers leading to their dismissal from the case (section 506); 4) indicated that any advanced payments by a defendant cannot be construed as an admission of liability (section 507); 5) reversed the standard collateral source rule, denying plaintiffs the ability to collect damages that had already been covered by an insurer (section 508); 6) specified that the trier of fact must make separate findings with respect to the various categories of damages and required that future damages for healthcare and other expenses be paid in periodic installments (section 509); 7) required the present value discounting of awards for lost earnings (section 510); 8) provided guidance regarding the preservation and accuracy of medical records (section 511); 9) specified standards for the qualifications of expert witnesses (section 512); 10) codified a seven-year statute of repose (section 513); 11) constituted a commission tasked with investigating the change of

the rules governing venue in Pennsylvania medical malpractice cases (section 514); and 12) specified considerations that can be made in remittitur decisions (section 515).

Outside of litigation, MCARE established the Pennsylvania Patient Safety Authority which created a system to collect data on medical errors and provide guidance on remedying underlying problems. The MCARE Act also included many provisions affecting medical malpractice insurance regulation.[3]

As a statistical matter, if multiple things are changing at the same time, it is generally not possible to isolate the change in some outcome variable (like insurance premiums or litigation rates) to any single variable that is changing. This is an example of what is called perfect collinearity.[4] While one might be able to narrow down that the change in the outcome variable was due to the set of things that were changing at the same time, it is not possible to determine how much of the change in the outcome variable is due to each of the individual changes in the other variables.

The Milliman authors attempt to wave away this concern by arguing that all of the other changes (except the venue restriction) arising due to the MCARE Act are likely to affect all counties of Pennsylvania equally, whereas the venue rule change will have its greatest effect on Philadelphia County and, to a lesser extent, Allegheny County. By making this assumption, the authors treat the other counties in Pennsylvania as de facto counterfactual control groups to account for any changes that arise from the non-venue aspects of the MCARE Act.

Theoretically, it is easy to think of a mechanism by which a change to collateral source rules could have differential effects in urban versus suburban or rural communities. For example, Philadelphia County has a significantly higher poverty rate than the counties that surround it.[5] Individuals who are poor, low income, or unemployed are likely to have significantly lower economic damages arising from a medical malpractice claim because lost wages will be negligible. If insured medical bills are effectively stripped from potential damages due to the collateral source change, plaintiffs have a substantially reduced incentive to bring a lawsuit and contingency fee-based plaintiff lawyers likewise have little incentive to take such a case. In the more affluent surrounding counties, the loss of insured medical costs from any potential judgment or settlement will have a proportionately smaller effect as residents of those counties are more likely to have other economic damages. This plausible idea would necessarily lead to a reduction in medical malpractice claims in Philadelphia relative to its neighboring counties. It is impossible for the Milliman researchers to isolate any venue effect from this collateral source effect.

Beyond this fatal flaw in the Milliman analysis, the work is unreliable in a host of other ways as well. At no point in their analysis did the authors ever provide any way for a reader to assess the statistical significance[6] of their estimates of the effect of the change in the venue rule. Failure to engage in tests of

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[3] For example, the required per occurrence limit for medical malpractice liability insurance was reduced from $1.2 million to $1 million (MCARE section 711(d)(2)(ii).

[4] See, for example, Jeffrey M. Wooldridge (2009), Introductory Econometrics: A Modern Approach, 4th ed, p. 85.

[5] In 1999, Philadelphia County had 23 percent of its residents below the poverty line. The comparable number for Delaware County was 8 percent, Montgomery County was 4 percent, Chester County was 5 percent, as was Bucks County. Similar disparities can be found throughout the time period examined in the Milliman Report. Data can be examined using the Census Bureau's American Fact Finder tool available at https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

[6] Correlations or other seemingly systematic patterns often happen by chance alone. For example, if a coin is flipped enough times, one can find runs where "heads" might come up five, six, seven times or more in a row, even if heads only comes up 50 percent of the time when the coin is flipped hundreds or thousands of times in total.

statistical significance leaves open the possibility that the declines in premiums and litigation metrics could be consistent with mere random chance alone. By not providing an assessment of these drops relative to the natural variation in the data, it is hard to draw any systematic conclusions. All of the estimates in the Milliman Report could be based on statistical noise.[7]

Perhaps most crucial, however, is the failure to account for contemporaneous background trends. That is, it is well-known that medical malpractice lawsuits have been declining nation-wide particularly in the period examined by Milliman. In one comprehensive study, Paik, Black, and Hyman (2013) find "Payouts per physician have been dropping since 2003, and by 2012 were 48 percent below their 1992 level. The 'third wave' of damage cap adoptions over 2003–2006 contributed to this trend, but there are also large declines in no-cap states.[8]" That is, even in states where there was no medical malpractice law change, medical malpractice litigation rates declined over this period. Given that other states were generally not changing their venue rules during this period, clearly other forces were driving down litigation.[9] Failure to account for this general nationwide trend in their analyses undercuts the validity and reliability of the Milliman Report. The Pennsylvania Supreme Court data relied on by the Milliman Report authors cannot be used reliably to answer the question of what changes were caused by MCARE because the PA data provide no basis for estimating what would have happened in the counterfactual scenario where MCARE was not passed. To estimate such a counterfactual, it is necessary to examine what occurred in the same time period in other states where MCARE was not implemented.

A related issue is the well-known insurance underwriting cycle in which insurers cut premiums when outside investment income is good, leading to a general downward trend in the cost of medical malpractice liability insurance. This downward trend reverses when outside investment opportunities worsen, leading insurers to increase their premiums to re-build their reserves. Many researchers and

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Some investigation must be made regarding how likely the observed pattern or correlation is given the background variation in the phenomenon being studied to determine whether the observation is anything beyond mere chance. The standard way to do this in scientific inquiries is to provide some test of statistical significance. The Milliman Report does not provide any such tests, nor does it provide the necessary information so that a reader could perform these tests on his or her own.

[7] For discussions of statistical significance, see Federal Judicial Center (2011), Reference Manual on Scientific Evidence, 3rd ed., chapters on statistics and multiple regression (available at https://www.fjc.gov/sites/default/files/2015/SciMan3D01.pdf). Briefly, standard tests of statistical significance compare a measurement or an estimate to some hypothesized effect. In this case, one might compare the Milliman estimates of the declines in medical malpractice premiums or reductions in case filings, against a hypothesis of zero effect. To assess how likely one would be to observe the estimated effect of the true effect were zero, one needs an estimate of the volatility of the data. With such an estimate (known as a standard error), it is possible to provide a probabilistic estimate of how likely (or, perhaps more intuitively how unlikely) it would be to observe the estimated effect given that the true effect is zero and given the underlying volatility of the data. This process would generate a so-called p value which would provide the probability that one would observe an effect as large in magnitude as the estimated effect if there were no actual systematic effect of the given variable (i.e., the venue rule change) on the outcome variable. If this p value were lower than some pre-specified judgment (conventionally this threshold is set at 5 percent), the estimates would be referred to as "statistically significant." That is, it would be unlikely that the estimate would have arisen by mere chance. This approach was famously given judicial notice in CASTANEDA v. PARTIDA, 430 U.S. 482 (1977), see especially footnote 17.

[8] Myungho Paik, Bernard Black, and David A. Hyman (2013), "The Receding Tide of Medical Malpractice Litigation: Part 1—National Trends" Journal of Empirical Legal Studies, 10(4): 612-638.

[9] Adam C. Schaffer, Anupam B. Jena, Seth A. Seabury, Harnam Singh, Venkat Chalasani, Allen Kachalia (2017), "Rates and Characteristics of Paid Malpractice Claims Among US Physicians by Specialty, 1992-2014," JAMA Internal Medicine, 177(5): 710-718 find a similar decline in medical malpractice litigation rates nationwide.

practitioners believe the background trends created by this cycle dominate other influences in the pricing of liability insurance. A failure to account for these trends makes it impossible to isolate the effects of individual state policies on insurance prices.[10]

To attempt to address some of these shortcomings, I performed an empirical analysis using the publicly available[11] National Practitioners' Data Bank (NPDB).[12] While the NPDB data do not allow me to examine county level litigation, the way the Pennsylvania Supreme Court data[13] used in the Milliman study does, the NPDB does allow for a number of benefits. First, relative to the concern that there are generic background trends that need to be accounted for, the NPDB includes data from every state in the country, so it will be possible to disentangle what happened after 2003 in Pennsylvania from what was going on everywhere else. Second, the NPDB data go back substantially earlier, namely 1990, than the Pennsylvania court data which is only available since 2000, allowing one to be more confident of what the baseline level of litigation pressure was (relative to other jurisdictions) before any Pennsylvania changes were enacted in 2003. Also, the NPDB includes settlements in addition to court judgments, which presumably gives a more complete picture of the liability environment. Given that such a large majority of cases settle, [14] any assessment of the effect of tort law changes that focuses only on final verdicts (such as the analysis in the Milliman Report) is surely incomplete and very likely misleading.

The Milliman Report's basic conclusion is that a reversal of Pennsylvania's venue rule will generate more litigation in Pennsylvania, particularly in Philadelphia County as plaintiffs seek courts and juries that will be more favorable to borderline or frivolous claims. This will lead, the report continues, to increased defense costs and increased insurance costs for doctors. If these things are true, rather than just a faulty conclusion drawn from unreliable statistical methods, it should be the case that Pennsylvania exhibited a state-wide decline in medical malpractice settlements and judgments after 2003 relative to other states. Strictly speaking, however, even if this result is found, it is not possible statistically to separate out the effect of Pennsylvania's venue rule change from all of the other MCARE Act changes, but it is a useful inquiry because if Pennsylvania does not exhibit a decline compared to other states at all, it is completely implausible that the venue restriction has generated substantial reductions in litigation and liability pressure.

The Effect of MCARE on Medical Malpractice Claims

Using the NPDB data from 1990-2017, I constructed data on the total number of medical malpractice settlements that appear in the NPDB in each state for each year. To adjust for differential populations, I

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[10] See, for example, Scott Harrington, Patricia Danzon, and Andrew Epstein (2008), "'Crises' in Medical Malpractice Insurance: Evidence of Excessive Price-Cutting in the Preceding Soft Market," Journal of Banking and Finance, 32(1): 157-169.

[11] https://www.npdb.hrsa.gov/resources/publicData.jsp

[12] For a discussion of this dataset, see Eric Helland, Jonathan Klick, and Alexander Tabarrok (2005), "Data Watch: Tort-uring the Data," Journal of Economic Perspectives, 19(2): 207-220, 216-217.

[13] http://www.pacourts.us/news-and-statistics/research-and-statistics/medical-malpractice-statistics

[14] Empirical studies of settlement rates in medical malpractice cases regularly find settlement rates in the 70-90 percent range. Even this number overstates the likelihood a case comes to a judgment since in most of those studies, the data only include cases that were not dropped or dismissed at an early stage. Such drops and dismissals are quite common. For a review of some of the empirical studies, see Philip Peters (2007), "What We Know About Malpractice Settlements," Iowa Law Review, 92: 1783-1833.

divide this number by the total population in the state for the given year.[15] I then use the natural logarithm of this number as the outcome or dependent variable in my regression[16] analyses.[17] To account for potentially differential baselines in litigation rates, I control for state fixed effects and to account for any potential nationwide background trend, I also include year fixed effects. My policy variable of interest is the Pennsylvania MCARE change, which takes the value of 0 except for Pennsylvania observations after the year 2003. This approach is a so-called fixed effects model or a difference-in-difference model that has become the basic tool of policy evaluation.

This fixed effect model allows one to isolate changes that occur when the policy is adopted relative to the pre-adoption baseline in the state adopting the policy and relative to any contemporaneous trends that occurring across the country. Intuitively, this approach parses out of the data any constant idiosyncratic baseline differences between states (e.g., if the people of state X are always more litigious than the residents of state Y, one would not want to conflate that pre-existing difference with the effect of a particular policy that is in place in one state but not the other). Likewise, if a particular year seems to be more litigious all throughout the country than other years (e.g., if the federal government changed the tax treatment of tort settlements and judgments, it might affect litigation patterns throughout the country), it would not be proper to conflate the generic nationwide change with the effects of laws that were passed at the same time in some of the states. After these constant differential state baselines are pulled out of the data and the nationwide background time effects are also pulled out of the data, one can examine the correlation between changing variables (including law changes) at the state level and the outcome variable (that has been adjusted to account for the state baselines and the common background time effects).

The number provided in each of the tables below provides the best estimate of the percentage change in the outcome variable (so for Tables 1 through 3, the number of settlements) that is associated with the passage of the whole set of MCARE changes in Pennsylvania. This estimated change is relative to the pre-MCARE baseline in Pennsylvania net of the average change from pre-2003 baselines in each of the other states. That is, the estimate tells us how different was the post-2003 change in Pennsylvania as compared to the post-2003 change everywhere else.

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[15] I use the SEER population data which is standard in public policy studies: https://seer.cancer.gov/popdata/download.html.

[16] Linear regression is the standard empirical approach in the social sciences and in public policy analysis. Essentially, the regression method finds the linear function that provides the "best fit" of the outcome variable data, using the explanatory variables as the elements of that linear function. Specifically, in the present study, the regression estimates the coefficients (a, b, c, etc.) in the following function: Settlements = a + b*MCARE + c*X where X is a set of other "control" variables (including here controls for each state and controls for each year in the data). The estimates of a, b, and c are chosen so as to generate the smallest differences (actually the squared differences so as to make over estimates and underestimates of equivalent magnitudes the same in difference terms) between the actual settlement observations in the data and the number of settlements that are predicted by the function. For a discussion of this method, see Federal Judicial Center (2011), Reference Manual on Scientific Evidence, 3rd ed., chapter on multiple regression (available at https://www.fjc.gov/sites/default/files/2015/SciMan3D01.pdf).

[17] Using the natural logarithm has two advantages: 1) To the extent that there are baseline differences in the rate across states, using the logarithmic scale focuses attention on rates of change, rather than level differences and 2) using the logarithmic scale allows one to interpret regression coefficients as a percentage change. See, for example, Jeffrey M. Wooldridge (2009), Introductory Econometrics: A Modern Approach, 4th ed, p. 190-191.

Table 1: Number of Medical Malpractice Settlements Made in Each State	
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017	
(standard errors clustered[18] by state presented in parentheses)	
Pennsylvania MCARE Changes	0.03 (0.03)
State Fixed Effects	Yes
Year Fixed Effects	Yes

The NPDB data suggests that Pennsylvania's medical malpractice payment frequency (scaled by population) did not change in a statistically significant way after the MCARE changes (including the venue restriction) were adopted. If anything, the rate increased slightly (3 percent) as indicated by the number presented in the table, though the results are not statistically distinguishable from a zero effect. Contrary to the Milliman suggestion, the change in venue rule as well as all of the other elements of MCARE did not change Pennsylvania's liability pressure relative to other states on average, taking account of general nationwide background trends.

To take another look at the Pennsylvania experience, I restrict attention to Pennsylvania and its border states (DE, NJ, NY, OH, WV, and MD) on the intuition that these states may be more comparable to Pennsylvania in important ways. For example, the Dartmouth Atlas Project examining Medicare data has found large regional differences in medical practices of doctors.[19]

Table 2: Number of Medical Malpractice Settlements in PA and its Border States	
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017	
(standard errors clustered by state presented in parentheses)	
Pennsylvania MCARE Changes	0.07 (0.14)
State Fixed Effects	Yes
Year Fixed Effects	Yes

Once again, I find that Pennsylvania's medical malpractice payment frequency was not systematically different from the frequencies observed in its neighboring states.

Two of the border states, Ohio and West Virginia did enact non-economic damage caps during the Pennsylvania medical malpractice law change period, so I re-ran the border state regressions dropping those states since we might expect caps to have an important effect on litigation and, so, those states might not be sensible comparators for Pennsylvania.

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[18] Clustering of standard errors accounts for the fact that a variable in state a at time t is not statistically independent of the same variable in state a at time t+1. Failure to account for this dependence in the data can cause a researcher to overstate the confidence he has in his results. For a technical treatment of this issue, see A. Colin Cameron and Pravin Trivedi (2005), Microeconometrics: Methods and Applications, p. 834.
[19] For a general overview of the Dartmouth Atlas project, see https://www.dartmouthatlas.org.

Table 3: Number of Medical Malpractice Settlements in PA and its Border States	
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017	
Sample Restricted to PA and Border States (OH and WV Omitted)	
(standard errors clustered by state presented in parentheses)	
Pennsylvania MCARE Changes	-0.04 (0.14)
State Fixed Effects	Yes
Year Fixed Effects	Yes

Although the direction of the Pennsylvania MCARE effect switched, the estimate remains statistically indistinguishable from zero. In terms of the volume of regulation, once background trends are accounted for and statistical significance is assessed, it is difficult to maintain the Milliman Report's conclusion that restriction of venue reduced medical malpractice litigation. Thus, it is very unlikely that going back to the more expansive venue rule will open the floodgates to additional medical malpractice claims.

The Effect of MCARE on Medical Malpractice Awards and Settlements

The NPDB data can also inform discussions about the size of medical malpractice awards. While the Milliman Report suggests that getting rid of the restrictive venue rule will increase the size of plaintiff medical malpractice awards (see Milliman Report Exhibit 3 page 3), the NPDB data support no such concern. Using the payment variable (which includes both judgments and settlements) in a regression framework similar to that used above (i.e., using state and year fixed effects to pull out differences in baseline awards across states and general nationwide trends), the total effect of the Pennsylvania MCARE changes is presented in Table 4 below. For the outcome variable, I use the natural logarithm[20] of the payment variable.[21]

As above, the number provided in each of the tables below provides the best estimate of the percentage change in the outcome variable (so for Tables 4 through 6, the dollar amount of judgments/settlements) that is associated with the passage of the whole set of MCARE changes in Pennsylvania. This estimated change is relative to the pre-MCARE baseline in Pennsylvania net of the average change from pre-2003 baselines in each of the other states. That is, the estimate tells us how different was the post-2003 change in Pennsylvania as compared to the post-2003 change everywhere else.

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[20] Results are qualitatively similar if I use the payment amount directly in the regression, or if I use the payment amount in a negative binomial model that takes account of the integer nature of the outcome variable.
[21] Much like the PA Supreme Court data used in the Milliman study, the NPDB also provides payment ranges (formally, it provides the midpoint of the range the particular settlement or judgment falls in), though the NPDB used much smaller ranges than those used in the Milliman Report. For details, see https://www.npdb.hrsa.gov/resources/publicData.jsp

Table 4: Medical Malpractice Settlement/Judgment Amounts		
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017		
(standard errors clustered by state presented in parentheses)		
Pennsylvania MCARE Changes	0.17***	
	(0.04)	
State Fixed Effects	Yes	
Year Fixed Effects	Yes	
***Statistically significant at the 1 percent level (i.e., p < 0.01)		

In the settlement regressions, the effect of Pennsylvania's changes appears to have been to increase settlement and judgment amounts by about 17 percent (as indicated by the number in the table) relative to the rest of the country on average.[22] This effect is statistically significant. Not only does the systematic analysis of the NPDB not support the Milliman contention, it actually goes the other way. As before, however, it might be argued that using all of the rest of the country as a counterfactual comparison for Pennsylvania is not sensible. To address this, in Table 5, I present the same regression estimated only on Pennsylvania and its border states.

Table 5: Medical Malpractice Settlement/Judgment Amounts		
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017		
Sample Restricted to PA and Border States		
(standard errors clustered by state presented in parentheses)		
Pennsylvania MCARE Changes	0.06	
	(0.03)	
State Fixed Effects	Yes	
Year Fixed Effects	Yes	

Once only border states are used as counterfactual comparators, the size of the increase in settlement/judgment amounts gets substantially smaller and is no longer statistically significantly different from zero. As before, we might be concerned by including the states of Ohio and West Virginia given their own medical malpractice changes occurring at roughly the same time as Pennsylvania's, so in Table 6, I provide results for the regression when those states are removed from the sample, leaving only the border states of DE, NJ, NY, MD in addition to PA.

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[22] Note that this does not mean that the outcome rose in Pennsylvania; instead, it means that the outcome in Pennsylvania did not decline as fast as it did elsewhere.

Table 6: Medical Malpractice Settlement/Judgment Amounts		
Regression Analysis of National Practitioners' Data Bank (NPDB) Data -- 1990-2017		
Sample Restricted to PA and Border States (OH and WV Omitted)		
(standard errors clustered by state presented in parentheses)		
Pennsylvania MCARE Changes	0.03 (0.02)	
State Fixed Effects	Yes	
Year Fixed Effects	Yes	

Again, the effect of the Pennsylvania MCARE changes (including the venue restriction) is not statistically significant. This analysis draws into question the validity and the reliability of the Milliman Report and, therefore, its conclusions as well. Analysis of the NPDB does not support the conclusion that if Pennsylvania were to abolish the restrictive venue rule, medical malpractice settlement and judgment payments would increase. The NPDB analysis suggests that nothing systematic will happen to these payments, much like the earlier analysis of the number of settlements and judgments indicated the MCARE changes had not had much of an effect there either.

The Effect of MCARE on Medical Malpractice Premiums

The Milliman Report also makes strong claims about the likely effect of reversing the venue rule on medical malpractice insurance premiums. To analyze this conclusion in a framework similar to the one used above, I used the survey data from the Medical Liability Monitor Survey, which has been collecting premium data across multiple firms in every state since 1991 (asking about premiums in 1990).[23] This data asks insurance companies to provide their premiums (and any surcharges) for three specialties: Internal Medicine, General Surgery and Obstetrics/Gynecology as well as the associated policy limits. Since each of these specialties might have systematically different background risks in each different state, and that risk might be modified by the particular policy limit and it might be priced differently by a particular insurer, I include fixed effects for the state X specialty X limit X insurer category, as well as year fixed effects to account for nationwide background trends. Again, the policy variable of interest is the MCARE variable which takes the value of 0 except for Pennsylvania observations after 2003. The outcome variable is the natural logarithm of the total premium charged including any surcharges for the given specialty in the given state with the given policy limit by a given insurer in a particular year.

As above, the number provided in each of the tables below provides the best estimate of the percentage change in the outcome variable (so for Table 7 through 9, the amount charged for medical malpractice premiums) that is associated with the passage of the whole set of MCARE changes in Pennsylvania. This estimated change is relative to the pre-MCARE baseline in Pennsylvania net of the average change from pre-2003 baselines in each of the other states. That is, the estimate tells us how different was the post-2003 change in Pennsylvania as compared to the post-2003 change everywhere else.

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[23] See https://medicalliabilitymonitor.com/rate-survey/ . For a discussion and documentation of the process of digitizing these data, see Bernard Black, Jeanette W. Chung, Jeffrey Traczynski, Victoria Udalova, and Sonal Vats (2017), "Medical Liability Insurance Premia: 1990–2016 Dataset, with Literature Review and Summary Information," Journal of Empirical Legal Studies, 14(1): 238-254.

Table 7: Medical Malpractice Premiums	
Regression Analysis of Medical Liability Monitor Data -- 1990-2016	
(standard errors clustered by state presented in parentheses)	
Pennsylvania MCARE Changes	0.21***
	(0.04)
State by Specialty by Insurance Limit by Insurer Fixed Effects	Yes
Year Fixed Effects	Yes
***Statistically significant at the 1 percent level (i.e., p < 0.01)	

Contrary to the Milliman conclusion, it appears as though medical malpractice rates went up when the MCARE changes (including the venue restriction) went into place by about 21 percent (the number in the table), when compared against what was happening elsewhere nationwide.[24] Table 8 provides results when the sample is restricted to just Pennsylvania and its border states.

Table 8: Medical Malpractice Premiums	
Regression Analysis of Medical Liability Monitor Data -- 1990-2016	
Sample Restricted to PA and Border States	
(standard errors clustered by state presented in parentheses)	
Pennsylvania MCARE Changes	0.15
	(0.08)
State by Specialty by Insurance Limit by Insurer Fixed Effects	Yes
Year Fixed Effects	Yes

Although the coefficient is still positive, it is much smaller and is no longer statistically significant. This suggests that MCARE (and its venue restriction) did not have a systematic effect on medical malpractice premiums in Pennsylvania. Lastly, to guard against any misleading effects arising from the fact that OH and WV were engaging in medical malpractice law changes in the same time period as Pennsylvania, Table 9 provides results when these states are eliminated from the sample.

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[24] Note that this is not suggesting Pennsylvania rates went up in absolute terms. In fact, as implied by the Milliman study as well, rates declined in Pennsylvania after 2003. What these results indicate, however, is that the decline observed in Pennsylvania was actually smaller in proportionate terms than the decline observed in other states on average during this time period.

Table 9: Medical Malpractice Premiums		
Regression Analysis of Medical Liability Monitor Data -- 1990-2016		
Sample Restricted to PA and Border States (OH and WV Omitted)		
(standard errors clustered by state presented in parentheses)		
Pennsylvania MCARE Changes	0.03 (0.02)	
State by Specialty by Insurance Limit by Insurer Fixed Effects	Yes	
Year Fixed Effects	Yes	

The estimated effect on premiums is smaller using this sample, and the effect is not statistically significant. With respect to the Milliman Report's specific claims regarding medical malpractice liability insurance premiums and attendant changes in the insurance market (e.g., more providers), the Medical Liability Monitor survey data provide no evidence supporting this claim. These results suggest that rates came down in Pennsylvania after 2003 for reasons having little to do with any Pennsylvania specific policies. Indeed, any change in Pennsylvania premiums was statistically indistinguishable from contemporaneous changes in neighboring states.

The Milliman Report's Analyses Are Not Reliable

Given these results, it is peculiar that the Milliman study came up with such different conclusions. The primary reason for this is a failure to systematically account for background trends indicating that what was happening in Pennsylvania was largely happening elsewhere too. While there are points in the Milliman Report where the authors compare a Pennsylvania number to individual numbers from other states (see, for example, Milliman Report p. 8, Tables 1 and 2), the authors provide very little documentation of what they actually do, including what exact periods they examine, beyond simply noting that they examine the change from some time before the MCARE changes and some time after these changes. To the extent they examined a particular year before and a particular year after (as opposed to estimating an average baseline for the before period and an average outcome in the after period, controlling for nationwide trends, as is done in my regression analyses above), data from an individual year can be quite volatile and misleading. Further, as noted above, at no point do the authors provide the information necessary to determine whether their estimates are even statistically significant. That is, for all a reader knows, their results could be completely consistent with normal variation and no systematic effect of the MCARE changes on any of the outcomes they examine. Their approach is unreliable, and their conclusions are not valid.

Lastly, regardless of the unreliable nature of the analyses presented in the Milliman Report, it is not possible to parse out the effects of the change in the venue rule in 2003 separately from all of the other changes MCARE brought. Significant changes include factors affecting the expected value of tort claims through the reversal of the collateral source rule, changes in how lost earnings are calculated (i.e., the requirement to discount them to present value terms), and the mandating that damages for future expenses be made in periodic payments. They also include the creation of a data collecting and information disseminating body in the Pennsylvania Patient Safety Authority which had the potential to alter the underlying incidence of the actions that give rise to medical malpractice claims to begin with.

Lastly, MCARE also changed many aspects of the medical malpractice insurance regulatory framework in Pennsylvania. Even if the Milliman authors had used reliable statistical methods, it would not have been possible to credibly link changes in litigation metrics or insurance premiums specifically to a change in the venue rule when so many other relevant things were changing at the same time.

Conclusion

The medical malpractice landscape changed after the early 2000s. Filing rates and awards appear to have declined, as have medical malpractice insurance rates. While people who advocated for tort law changes suggest modifications of medical malpractice law should be given credit for these trends, this conclusion runs into the problem that these trends are present even in states that did not change their medical malpractice laws. This strongly indicates that it is not possible that changes in medical malpractice laws caused the observed changes in litigation and insurance premiums.

Pennsylvania's MCARE Act was passed toward the beginning of this nationwide trend. Once the background trend is removed from the data, there is no evidence that MCARE had any significant effect on medical malpractice filing rates, settlements and awards, or medical malpractice premiums. Given that, the data do not support the conclusion that medical malpractice claims and insurance premiums would increase if the MCARE Act's venue restriction were reversed. The analysis and the conclusions in the Milliman Report are not reliable and do not meet even the most basic standards of empirical policy analysis.

Qualifications: Jonathan Klick holds a Ph.D. in economics and a J.D. from George Mason University. He is a full tenured professor at the University of Pennsylvania. He is also the Erasmus Chair of Empirical Legal Studies at the Erasmus University in Rotterdam (the Netherlands). He previously held the Jeffrey A. Stoops Chair in Law and Economics at the Florida State University. Klick has held visiting professorships at Yale University, Columbia University, Northwestern University, the University of Southern California, the University of Canterbury (New Zealand), Hamburg University (Germany), Bar Ilan University (Israel), the University of Ljubljana (Slovenia), and Waseda University (Japan). He was the inaugural associate director of the American Enterprise Institute's Liability Project, and he was a senior economist at the Rand Corporation's Institute for Civil Justice. He has published peer-reviewed articles in economics, law, health, crime, statistics, and public policy journals.

Jonathan Klick
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